

# Selenium for preventing cancer

Gabriele Dennert, Marcel Zwahlen, Maree Brinkman, Marco Vinceti, Maurice P. A. Zeegers, Markus Horneber

*The independent commentary was written by Luciana Lage Meijia Zapata*

## ABSTRACT

**BACKGROUND:** Selenium is a trace element essential to humans. Higher selenium exposure and selenium supplements have been suggested to protect against several types of cancers.

**OBJECTIVE:** Two research questions were addressed in this review: What is the evidence for: 1. an aetiological relationship between selenium exposure and cancer risk in women and men?; 2. the efficacy of selenium supplementation for cancer prevention in women and men?

**SEARCH STRATEGY:** We searched electronic databases and bibliographies of reviews and included publications.

**SELECTION CRITERIA:** We included prospective observational studies to answer research question (a) and randomised controlled trials (RCTs) to answer research question (b).

**DATA COLLECTION AND ANALYSIS:** We conducted random effects meta-analyses of epidemiological data when five or more studies were retrieved for a specific outcome. We made a narrative summary of data from RCTs.

**MAIN RESULTS:** We included 49 prospective observational studies and six RCTs. In epidemiologic data, we found a reduced cancer incidence (summary odds ratio, OR, 0.69; 95% confidence interval, CI, 0.53 to 0.91) and mortality (OR 0.55, 95% CI 0.36 to 0.83) with higher selenium exposure. Cancer risk was more pronouncedly reduced in men (incidence: OR 0.66, 95% CI 0.42 to 1.05) than in women (incidence: OR 0.90, 95% CI 0.45 to 1.77). These findings have potential limitations due to study design, quality and heterogeneity of the data, which complicated the interpretation of the summary statistics.

The RCTs found no protective efficacy of selenium yeast supplementation against non-melanoma skin cancer or L-selenomethionine supplementation against prostate cancer. Study results for the prevention of liver cancer with selenium supplements were inconsistent and studies had an unclear risk of bias. The results of the Nutritional Prevention of Cancer Trial (NPCT) and SELECT raised concerns about possible harmful effects of selenium supplements.

**AUTHORS' CONCLUSIONS:** No reliable conclusions can be drawn regarding a causal relationship between low selenium exposure and an increased risk of cancer. Despite evidence for an inverse association between selenium exposure and the risk of some types of cancer, these results should be interpreted with care due to the potential limiting factors of heterogeneity and influences of unknown biases, confounding and effect modification.

The effect of selenium supplementation from RCTs yielded inconsistent results. To date, there is no convincing evidence that selenium supplements can prevent cancer in men, women or children.

This is the abstract of a Cochrane Review published in the Cochrane Database of Systematic Reviews (CDSR) 2011, Issue 5, Art n° CD005195. DOI:10.1002/14651858.CD005195.pub2 (<http://www.thecochranelibrary.com>). For full citation and authors details, see reference 1.

For Latin America and the Caribbean, the full text is freely available from: <http://www.cochranejournalclub.com/selenium-preventing-cancer-clinical/pdf/CD005195.pdf>

## COMMENTS

Selenium is an essential trace mineral that is important for maintaining a healthy immune system. The role of diet in carcinogenesis as a potential factor that could modify the risk of cancer is still controversial, and identification of a nutrient with anticancer properties would have a huge impact on public health.

This review<sup>1</sup> included 55 studies with more than one million participants. Forty-nine of these studies analyzed whether healthy people with high levels of selenium in the blood or with high intake of the mineral would develop cancer more or less often than other people. It was observed that people with higher levels or intake of selenium had lower frequencies of certain types of cancers such as lung, bladder and prostate cancer, but no difference for other types such as breast cancer. However, through these studies, it was not possible to determine whether the real reason for the reduction in cancer risk was the selenium level or intake. Many other factors could influence the risk of the disease, such as a balanced diet or healthy lifestyle habits.

Further research is needed in order to understand the potential beneficial effects of selenium and the mechanisms through which this mineral prevents cancer before any recommendation can be made.

**Luciana Lage Meijia Zapata, MD.** Oncologist in the team at Instituto Brasileiro de Controle do Câncer and Hospital Beneficência Portuguesa, São Paulo, Brazil.

## REFERENCE

1. Dennert G, Zwahlen M, Brinkman M, et al. Selenium for preventing cancer. *Cochrane Database Syst Rev.* 2011;(5):CD005195.